

Electric fencing

Operating instructions

Basic facts :

These are universal operating instructions for all mains electric fencing as well as devices powered by disposable/rechargeable batteries.

We thank you for choosing our products. Our electric fencing is manufactured with great care and tested before being delivered to the warehouse in order to give you complete satisfaction.

Your electric fence will enable you to fence off your various enclosures in order to keep your animals inside or to prevent animals entering from outside (in the case of protecting crops).

Owing to its "low impedance" technology, your electric fence will still be effective even in the event of line failure. Nevertheless, it is of the utmost importance that fencing should be installed correctly from an electrical point of view so as to avoid the risk of radio-electrical interference.

All our equipment complies with EC electromagnetic compatibility requirements. Interference suppressors are inserted in the energiser electronic circuit to limit electromagnetic radiation.

Mains electric fencing must only be connected to an internal electrical installation that complies with the regulations in force.

Fencing powered by disposable or rechargeable batteries can be installed externally or under shelter, and must be far away from flammable materials.

A brief summary of electric fencing :

One or more fence wires mounted on insulators form the boundary of the area where the animals are to be contained or are to be prevented from entering. An energiser sends electrical pulses along this wire at a maximum of once per second. These uncomfortable pulses pass through the body of any animal that touches the fence wire and then travel back to the energiser. The uncomfortable tingling received dissuades any animal from crossing the wire. It is important to leave the wire "in the air" at the end of the perimeter fence or to connect it to the point of departure without ever earthing it. It is the animal that makes the contact with the ground and consequently receives an electric shock. (See Fig. 3)

Instructions - Installing and connecting electric fencing for animals :

PLEASE READ BEFORE OPERATING

Electric fencing and its auxiliary equipment must be installed, used and maintained in such a way as to reduce any danger for persons, animals and their environment.

Electric fences in which animals or persons risk becoming entangled must be avoided. A single electric fence must not be powered by two different energisers or by independent circuits of the same energiser.

In the case of two different electric fences, each powered by a different energiser with its own time base, the distance between the two electric fence wires must be at least 2 m. If this space has to be closed, materials that are not electrical conductors must be used or an insulated metallic separation.

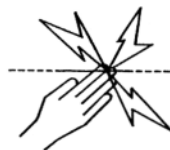
Barbed wire or other similar wire must not be electrified by an energiser.

Any part of an electric fence installed along a road or public footpath must be identified at frequent intervals by warning signs affixed securely to the fence posts or attached to the fence wire.

The dimensions of the warning signs must be at least 100 mm x 200 mm .

The background colour of both sides of the warning sign must be yellow. The wording on the sign must be black and consist of either :

- The symbol shown here* symbol for warning sign*



- The message «**WARNING-ELECTRIC FENCE FOR ANIMALS**», or similar.

The wording must be indelible, shown on both sides of the warning sign and the letters must be at least 25 mm high.

Please follow the recommendations below (see instructions to follow) for earthing.

Connecting wires located inside buildings must be properly insulated from grounded structural elements of the building. This can be done by using an insulated high voltage cable.

Buried connection wires must be inserted in ducting made from an insulating material, or a high voltage cable that is insulated in some other way must be used. Care should be taken to prevent damage to the connecting wire caused by animals' hooves or tractor wheels sinking into the ground.

Connection wires must not be installed in the same ducting as power cables, communication cables or data cables.

Connecting wires and electric fence wires must not pass above overhead power lines or communication lines.

Wherever possible, crossing overhead power lines must be avoided. If crossing an overhead power line cannot be avoided, the connecting wire must pass under the power line and at right angles to it, if possible. If the connecting wires and electric fence wires are installed close to an overhead power line, the clearance must not be less than that indicated in the table below :

Voltage of power line in volts	Clearance in metres
= 1000 V	3
>1000 = 33 000	4
> 33 000	8

If the connecting wires and electric fence wires are installed near an overhead power line, their height above ground must not exceed 3 m. This height restriction applies to all sides of the orthogonal projection of the wires that are outermost from the power line at ground level, for a distance of :

- 2 m for power lines operating at a nominal voltage not exceeding 1000 V ;
- 15 m for power lines operating at a nominal voltage that is in excess of 1000 V.

A distance of at least 10 m must be maintained between the earth electrode of the energiser and any other connected part of the earthing system, such as the power network protective earth or the telecommunication network earth.

Electric fences that are intended to frighten birds, to contain domestic animals or to channel animals such as cows only need to be powered by low output level energisers in order to provide satisfactory and reliable performance.

With electric fencing intended to prevent birds from perching on buildings, no electric fence wire must be connected to the earth electrode of the energiser. An electric fence warning sign must be installed at all places where people can access the conductors.

A non-electrified fence incorporating barbed wire or other similar wire may be used in addition to one or several staggered electrified wires in an electric fence. The supporting devices for the electrified wires must be constructed so as to ensure that such wires are positioned at a minimum distance of 150 mm from the side elevation of the non-electrified planes. The barbed wire or all other similar wire must be earthed at regular intervals.

When an electric fence crosses a public footpath, a non-electrified gate must be installed at the corresponding point in the electric fence or an opening with a stile. At all crossing points, the adjacent electrified wires must be fitted with electric fence warning signs.

Make sure that any auxiliary equipment operating on the network connected to the electric fencing circuit provides a degree of insulation between the fencing circuit and the power network that is equivalent to that provided by the energiser.

Protection against bad weather must be provided for auxiliary equipment unless the equipment is certified by the manufacturer as being suitable for external use and has a minimal degree of IPX4 protection.

Precautions :

Avoid all contact with the electric fence, especially the head, neck and torso. Do not try to go over, through or under an electric fence made up of several wires; use a gate or opening provided for this purpose.

Neither human beings or animals should receive more than one electric pulse per second. This is why you must never connect more than one energiser to a fence, even if it has several rows of wires. Similarly, if abnormal operation such as excessive pulses numbering more than 60 per minute is encountered, the fence must be immediately disconnected and taken to the retailer for repair.

The distance between two different fences powered by two separate energisers must never be less than 2 m so that no person or animal can inadvertently receive more than one pulse per second by touching both fences simultaneously.

Mains devices must not be handled in temperatures below 5 °C.

Ensure that in all circumstances an animal touching the fence can move away from it: any prolonged contact with the fence could cause serious burns (for example, do not run an electric fence through marshy ground where an animal could get stuck in the mud and be immobilised).

Do not use telegraph poles to support the wire of an electric fence.

Do not use this device for any other purpose than that for which it is intended.

Do not let an infant or small child play next to an electric fence.

■ Routine maintenance or dealing with faults :

Repairing an energiser and replacing its component parts requires specific knowledge of the device. This must be done by a qualified and authorised person using the original components suitable for each type of energiser.

Associating cards and transformers with capacitors without respecting base references can be risky and dangerous !

In the event of a malfunctioning of your energiser, please contact your authorised retailer (from whom the material was purchased). For your information, when changing a replaceable energiser fuse manually it must be substituted with an identical 1 Amp 5 * 20 quick blow glass fuse.

■ Meaning of the symbols used by Directive 2002/96/ec of 27.01.2003 printed on the energiser



- Read all instructions before use.



- This product must be recycled separately from other waste. It is therefore your responsibility to recycle this waste electronic equipment by taking it to a designated collection point for the recycling of electrical and electronic equipment. The separate collection and recycling of standard waste protects natural resources and ensures that products are recycled in such a way as to protect human health and the environment. For further information on recycling points for electrical and electronic waste, contact the recycling department of your local authority or the retailer from whom you purchased the equipment.

Refer to Directive 202/96/EC of 27.01.2003 concerning waste electrical and electronic equipment (WEEE).

■ How does my energiser and its accessories work ?

• Energiser (fig. a)

An energiser is a device that transforms electrical energy taken from the grid, from a disposable battery or from a rechargeable battery, with or without a solar panel, returning it in the form of electrical pulses. These pulses range between 5000 and 15 000 Volts depending on the energiser model and are sent at a maximum rate of once per second along the fence wire. The high voltage means the electricity travels more easily, but the pulses are naturally very short with more or less energy (quantity of electricity). This means they are not dangerous but are very uncomfortable.

In addition to the voltage, there is a certain quantity of electricity with each pulse that is measured in

Joules (unit of measurement of the quantity of electricity over a period of time), very close to Wh. It is this quantity of Joules that differentiates between the power of various fencing devices.

The greater the energy, the more painful the spark and the device can power a longer length of fence wire.

It is therefore important to adapt the device to the type of animals to be contained. A low energy device that is perfect for a dog will only amuse large cattle and will have no effect whatsoever on the latter. Conversely, it is not necessary to punish a dog severely to make him understand that he must not cross the wire! This also explains the choice of power operation and the range of devices offered.

Mains devices are easy to use and without maintenance. This is the technology to be favoured wherever possible.

Devices powered by disposable and rechargeable batteries are portable and useful where there is no other source of energy.

• Energy output (fig. b)

The energy output is measured in Joules. The reference value is 500 Ohms. In order to have energy, electricity must be consumed and the value of 500 Ohms is taken as a reference, including by the regulations, in order to measure all the energisers on the market under the same conditions regardless of their output voltage. Sometimes a large number of Joules is specified, however it all depends on what is being referred to.

This may be the maximum number of Joules supplied by the energiser.

This may be the number of Joules in reserve in the energiser capacitors.

This may be the number of Joules below 500 Ohms. Consequently, a comparison between one device and another or rather between one brand and another is impossible unless the common value used to obtain this energy is specified.

• Fence wire (fig. c)

The more the fence wire is a conductor of electricity, the greater the energy carried in Joules and the more the wire is suited to long lengths and large devices.

Electricity travels with more difficulty along a very fine wire which is not a problem over a short length of wire and with a small energiser, but it becomes more of a hindrance for long lengths of wire and large energisers. An Ultra Low Impedance energiser will never be able to send all its energy if the wire is too small. It is the same principle as the rate of flow of water in a pipe; it is impossible to obtain several cubic metres per hour using a very small tube, despite having a full reserve.

There are many different types and technologies of

fence wire, including colours that make the wire stand out to a greater or lesser degree so that it is visible, or conversely so that it does not show up against the natural background. Tapes and cords are often used for horses and wire for cattle, depending on requirements and preference.

- **Insulators** (*fig. d*)

Insulators all have the same purpose: to best insulate the wire carrying the electricity in relation to the ground or any support that is in contact with the ground, which would cause significant losses of energy. The current would travel back to the energiser and an animal coming into contact with the wire would not feel anything. The type of insulator varies according to their application, for example for screwing onto wood, affixing to metal stakes, etc....

The quality of the insulators is important and, following their application, some will be faster to implement than others.

- **Earth stakes** (*fig. e*)

Since the electricity travels back to the energiser (passing through the animal when it touches the wire) (Fig.3), the quality of the earth stakes is very important; it is as important as the choice of conductor wire. Poor soil conditions prevent the electricity from passing through the animal. The stakes should be installed carefully and the dampest possible spot chosen. Several earth stakes (5) will be necessary, spaced one metre apart, when using very powerful devices such as Ultra Low Impedance, for example.

- **Line stakes** (*fig. f*)

Line stakes allow the wires to be tightened and may be made of iron, plastic or wood. Generally, the stakes are spaced 3 to 4 metres apart on average, depending on the weight of the wires. Sometimes, wooden stakes are used every 20 metres to tighten the wire and simple plastic, fibre or iron stakes every 3 metres to stop the wires drooping between each of the wooden stakes.

Plastic, fibre or iron stakes are also recommended for temporary enclosures that will be dismantled once the animals have left.

- **Reels** (*fig. g*)

Reels are ideal for unwinding and rewinding the wire or cord in the case of temporary enclosures. Some reels are even geared so that the wire can be unwound faster. The reels are attached directly to a stake.

- **Gate handles** (*fig. h*)

Gate handles create a point of passage allowing the enclosure to be opened while holding the insulated handle safely in one's hand with no risk of receiving an electric shock. This enables the energiser to be left in operation and the animals confined while you may enter and leave the enclosure as you wish. Gate

handles are also a quick means of opening and closing an enclosure.

It is, however, advisable to pass a high voltage cable in the ground to connect the wires following on from the gate handle; in this way, even if the gate handles are removed the rest of the enclosure will still be electrified. (*fig. 2*)

- **Testers** (*fig. i*)

There are testers with lamps or digital testers giving a direct display of the line voltage. Others show the direction of energy losses.

The purpose of testers is to make it easier to identify faults and ensure sufficient line voltage in order to confine the animals. Testers are one of the indispensable tools for easily checking the perimeter of your electric fence installation. Although the indicators and lamps of the energisers give a good idea of the line voltage, it is almost impossible to find a fault in the event of accidental breaks in wire or tape conductors. The tester enables checks to be made at different points of the fence installation.

- **Connectors** (*fig. j*)

There are numerous connectors according to whether wire, cord or tape is used. The connection of conductors is particularly important because if there are bad contacts between several conductors there will be sparks and interference of radio waves, telephones, ADSL or even DTT. Furthermore, the sparks will cause overheating that will melt the plastic and the tape or wire will be irrevocably damaged. In the end the current will no longer be able to pass through these sections resulting in a fault.

- **High voltage cable** (*fig. k*)

Standard commercial electrical cables are only rated for 800 Volts. This is a long way off the 15 000 Volts that your energiser can supply. So after a few days, the cable will become perforated and sparks will make contact between the fence wire and structures connected to the ground (clay wall, wet conglomerate, cable ducts, building structures, shelters, etc...). All or part of the electricity will be lost before even reaching the electrification point.

A high voltage cable will not perforate and all the electricity from the energiser will be available at the connection point at the start of the fence installation.

The high voltage cable can be laid in a cable duct without any problems and can extend to several hundred metres in length without any losses.

Only the fence cable needs to be a high voltage cable, the earth cable can be a standard wire since the voltage at the earth rod is low provided it is installed well and there are not too many losses from the line.

- **Vegetation** (*fig. m*)

Depending on the power of your energiser, there will

be a noticeable difference in the case of over-abundant vegetation along the line. Ultra Low Impedance devices will have no difficulty in adapting and continuing their task of containing animals. Standard devices will burn the few blades of grass touching the wires, but in the case of a mass of vegetation their performance will be more or less affected. This will also depend on the distance of the vegetation. Consequently, for the optimum output of your energiser it is recommended that the wires be kept clear of vegetation.

• **Type of animals** (*fig. n*)

The choice of energiser, the type of conductors and the height at which they are installed play an extremely important role.

Starting from this, with the aid of the pictograms shown on the devices, the advice of your retailer and your layout diagram, you will be able to choose the appropriate equipment while taking into account the various parameters. *See the section below.*

• **Length of fence** (*fig. p*)

The length of electrified fence influences the type of energiser. The longer the fence, the more the number of losses increases proportionally.

It is not the total length of wire that counts, but the perimeter of the enclosure provided all the wires have been connected to each other at the beginning and end as shown in the diagram. Fences with several wires connected together are more advantageous than those connected to a single wire. They allow for an easier passage of the current and the electricity sent by the energiser.

• **Disposable and rechargeable batteries** (*fig. q*)

A disposable battery can only be used once and when it has run out must be replaced by a new battery. Disposable batteries cannot give as much power as a rechargeable battery and so are best used for small portable fencing equipment enabling weight and volume to be reduced.

A rechargeable battery is more expensive to buy, but quickly repays itself if well maintained (avoiding deep discharges and overcharging). It can be recharged many times without any problem. Rechargeable batteries have more power than disposable batteries and can power much more powerful energisers. For both types of battery, the higher the capacity in Amps/Hours (Ah), the greater the quantity of electricity stored. *See the section below.*

• IMPORTANT INFORMATION :

Mains powered energisers **must be installed under shelter** and must not be handled when the ambient temperature is less than + 5 °C ; they must also be positioned away from any flammable materials. All energisers have natural ventilation ; they must not under any circumstances be enclosed under pro-

tective plastic covering or placed in an underground tank. This would give rise to an abnormal level of humidity inside your energiser.

Provide either a disposable or rechargeable battery according to the power mode of your energiser. The type of power is written on your energiser body. See the section on disposable and rechargeable batteries.

The simplest method without maintenance is to power your energiser from the mains. When powered by disposable or rechargeable batteries, you must make sure disposable batteries are replaced when they have run out or that rechargeable batteries are recharged regularly. A 45 Ah 12v battery lasts approximately 35 days if the device consumes 45mA.

The higher the amp-hours (Ah) of the battery (12 volts only), the longer it lasts and the more the recharging is spaced out. "Saline" batteries are "low cost" and are not as long-lasting as alkaline batteries. The voltage of a saline battery gradually decreases as it is used. The voltage of an alkaline battery remains constant until the end of its life and it ensures optimum operation of your energiser until it runs out. Disposable batteries must not be recharged; never recharge a disposable battery, there is a risk of explosion.

A battery takes regular recharging. The higher the number of amp-hours, the longer the battery autonomy. A battery recharges at 10% of its rated capacity value, for example: an 80 Ah battery will be recharged at 8 amps maximum. A car battery may be suitable, but you should be aware that it will not take deep discharges; it therefore requires increased surveillance and regular recharging. A special fencing battery is to be preferred with a slow discharge (it does not have starter power) that is specifically designed for the operation of electric fences. Never store a flat battery, especially in winter because it can freeze. A battery becomes discharged over time, even if it is not used; recharge it from time to time, or use a charger with a "floating mode" option.

■ Materials required

Wooden, iron, plastic or fibre stakes approximately 1 to 1.5 m high. Good quality porcelain or plastic insulators, galvanised iron wire or tape, or flexible wire such as "filinox" consisting of steel and polyethylene (plastic) wire, accessories such as gate handles, a metal earth rod and high voltage cable for crossing walls or running alongside building structures.

■ Installing the fence

(See the diagrams at the beginning and end of this booklet)

Drive in your stakes at 3 to 5 metre intervals (put them closer together on uneven ground). Reinforce the cor-

ner stakes and all those bearing traction with strengthening junctions. Then attach the insulators to the stakes at the height desired, gradually unwinding the wire and passing it through the points provided on the insulator. Adjust the height of the row(s) of wire or tape according to the type and size of animal to be confined. (See diagrams) (fig. 1)

It is not necessary to make a loop and return to the point of departure in order for the fence installation to work properly. You can stop the installation at the last insulator at the end of the line. **Never connect the wire to ground at the end of the layout** (fig. 4). It is the animal that will close the circuit the moment it touches the wire; in this way, the electricity passes through the animal and travels back to the energiser via the ground and earth system.

Affix the energiser to the wall using 2 screws whose centre distance corresponds to the attachment holes on the back of the energiser body, or using the metal support provided.

Warning !

If you cross a wall or partition wall between the spot where you have installed your energiser and the place where you electrify the enclosure, and if the wire carrying the electricity cannot be mounted on insulators, it is of utmost importance to use special high voltage cable. Standard electrical cables are only rated for a maximum of 800 V which is a long way off the 10 000 or 15 000 Volts that your energiser can supply. Standard wire will end by becoming perforated and there will be numerous losses, sometimes completely eliminating the effectiveness of the energiser.

Gate or opening

The gate is a few metres wide and also comprises a wire. The hook and spring assembly known as a "gate handle" is situated at one end of the wire ; while the other end of the wire is attached to a pulley or a loop that you have made from the wire, or by means of special insulators such as A4021 (fig. 2).

This arrangement enables you to enter and leave the enclosure by unhooking the gate handle without the risk of receiving an electric shock, and then simply re-attaching the gate handle. The gate handle with its insulated grip enables you to open the circuit for enough time to pass through without, however, stopping the energiser.

(cont.) - Recommendations for maintenance of the electric fence

Your equipment is connected to the electricity distribution network and requires no particular maintenance. Nevertheless, we would remind you that it is strictly prohibited to install any equipment connected to the grid outside. Regularly check the output indicator of your energiser to see that it flashes at regular

intervals, and when necessary take a tour of your installation to prevent too much vegetation disrupting the overall operation of the fence. Any spark source causes interference. This can disturb the reception of audiovisual programmes, etc... Your installation must therefore be electrically correct.

Testing

When you introduce your animals into their electrified enclosure, always carry out a little training. Gently push the animals towards the electric wire so that each animal receives one or two electric shocks. That will be sufficient for them not to go near the fence any more.

Electric fence signage

Signage on the electric fence is obligatory when the fence runs alongside a public highway, and also when it is accessible but people are unaware of its presence. The user must therefore place along the accessible parts of the fence at a maximum of 50 metre intervals a clearly visible sign with the wording «Electric fence» or a pictogram of a hand as specified above in the Section "**INSTRUCTIONS FOR INSTALLING AND CONNECTING ELECTRIC FENCING FOR ANIMALS**".

Earth system

The role of the earth system is extremely important for the effectiveness of your electric fence whatever the type of energiser, and connections must be particularly well made. In fact, all the electrical energy that passes through the animal travels back to the energiser via the earth system. If the earth system is of poor quality, it will prevent an easy return of the electricity and the animal will feel nothing. The earth system must be more than 10 metres away from all other earthing systems (house, telephone, etc...), taking into account the route of the high voltage cable.

If it has not rained, pour several litres of water over the earth system once a week so as to reduce its resistive value and avoid the electricity not returning to the energiser. For disposable/rechargeable battery devices, a small 30 cm stake is generally sufficient. However for mains devices, one 1 m stake is required as a minimum ; sometimes several stakes are necessary if a high voltage is detected between the earth stake and the ground (> 2500V) or for Ultra Low Impedance devices.

Repairs

The repair of an energiser and the replacement of its components require specialist knowledge of the device. Repairs must be carried out using original components by a qualified and authorised person. In the event of a malfunction of your energiser, contact your

authorised retailer (place of purchase).

For your information, the energiser fuse must be replaced by an identical.

FURTHER INFORMATION

► Energiser with LED (graphic) output information

On the front of the energiser, a row of LED lamps light up according to the losses on the line. The greater the losses on the line, the higher the number of LEDs that light up. This means that with a perfect installation only the green LED will be illuminated; then as losses occur, the other LEDs will light up in turn. When the orange LED is illuminated, approximately 3500 volts remain on the line; this will still contain the animals, but it is time to check your overall installation.

Losses on the line may be due to branches falling on the wire, insulators in poor condition or over-abundant vegetation touching the wires (all the LEDs light up).

If no LED is illuminated and there is no voltage on the line, there must be a break in the wire or tape conductors.

If there is electrical current at the earthing system, it means the system is of insufficient quality and there will certainly also be significant losses on the line. The electrical energy sent by the energiser cannot travel back correctly to the energiser and stagnates at the foot of the earth stake.

► Energiser with digital display

When the energiser is live, sometimes the display shows a value that should not be taken into account. This value is used by the technical department in the event of a fault to measure what is known as "residual voltage".

In order to obtain the voltage remaining on the line at the start of the installation, press and hold down for two or three clicks of the energiser the TEST button located next to the output terminals.

The value indicated is read in kilovolts, for example: 7.8 KV is equal to 7800 Volts. The value can also be interpreted as a percentage, in the above example this means 78% of the energy supplied by the energiser has been returned.

The better the line is insulated, the higher the value in volts.

On the digital energiser, the **red** terminal corresponds to full power, the **yellow** terminal to reduced power and the **green** terminal to earth. You can power two

facilities at the same time, one with reduced power by connecting to the yellow terminal and one with full power by connecting to the **red** terminal.

Note that the value measured indicates the energy in volts that has been returned to the line. This does not mean you will have the same voltage at the end of the line if there are breaks in the conductors. Losses are detected, but not breaks in the conductors or openings in your electric fence circuits.

► Energiser with 1 control lamp

The line control lamp located between the output terminals of your energiser must light up once per second. If the energiser clicks and the lamp does not light up, this means there is an insulation fault on the line. If the lamp lights up once per second with each click but there is no electricity on the line, this means there is a break in one or more wires or a poor quality earthing system. If there is current at the earthing system, this means the line has short-circuited and the earthing system is not very good. Do not hesitate to wet the earthing system from time to time in summer.

► Energiser with 2 outputs

On the energiser, the red terminal **⚡** corresponds to full power, the yellow terminal **⚡** to reduced power and the green terminal **⊕** to earth. You can power two facilities at the same time, one with reduced power by connecting to the yellow terminal and the other with full power by connecting to the red terminal.

For all the energisers, the line control lamp located between the output terminals of the energiser must light up once per second. If the energiser clicks and the lamp does not light up, this means there is an insulation fault on the line. If the lamp lights up once per second with each click but there is no electricity on the line, this means there is a break in one or more wires or a poor quality earthing system. If there is current at the earthing system, this means the line has short-circuited and the earthing system is not very good. Do not hesitate to wet the earthing system from time to time in summer.

► Ultra Low Impedance energiser (U.B.I.) and delayed effect

■ Description

You have just purchased an **Ultra Low Impedance** energiser and we congratulate you on your choice of product. This energiser is designed to operate in the

most extreme circumstances and to ensure optimum conditions for enclosing your animals. **Ultra Low Impedance (U.B.I.)** means this device is designed to operate with electric fence lines that have even been "invaded" by vegetation, where a traditional device would be incapable of delivering sufficient energy and voltage to ensure the complete surveillance of your enclosure.

We would ask you to read the recommendations at the beginning of this booklet concerning all the safety regulations, use and installation instructions for electric fencing. This device is for connection to the mains, **it is prohibited to install the energiser outside for obvious safety reasons.**

■ Operating principle

This is an intelligent energiser controlled by a micro-controller that is able to increase the line energy as losses occur, while ensuring the safety of persons and animals that touch the fence wire. In order to do this, the state of the line is measured with each pulse so as to determine the threshold in terms of the quantity of electricity to be sent. Depending on the result of these measurements, the device will send the punishment pulse a few nanoseconds later. The measurement pulse and punishment pulse are so close together (within an overall time of less than 10 milliseconds) that the animal only feels one shock. The device has several operating levels that are clearly displayed on the main screen. The increase in power is progressive so as to ensure safety and give a person or animal caught in the fence the time to disentangle themselves. The LCD screen on the front of the Ultra Low Impedance energiser displays the output voltage, the number of Joules sent, the number of ohms on the line (the higher this value, the fewer the losses).

This device has a **DELAYED EFFECT of 15 seconds** which means that before adapting the higher punishment level to 5 Joules there will be 15 identical pulses at the current level of the energiser. At the end of this time period, the device will move on to the higher level and if this is sufficient it will stay at this level. An additional 15 seconds will be necessary following a requirement for more energy before the device moves on to an even higher level. Another case in point: if the increase to the higher level is not sufficient just after this delayed effect, there will be an **ADAPTATION TIME (AT)**. This AT is 5 seconds before the progressive increase in energy from level to level until the necessary level is reached to compensate for the line losses. The 5th level is the maximum at 15 Joules.

With the sudden disappearance of the fault, whatever the cause, the return to a level of energy that is reasonable for safety is immediate. In fact, any person or animal touching the wire at the moment the loss on the line disappears is certain to receive no more than 5 Joules as required by the current regulations NF EN 60 335-2-76 A12.

WARNING ALARM !

As required by the regulations, your energiser will enter an alarm state after six pulses in the event of a significant change in impedance being detected on the line (passing from more than 1000 ohms to less than 400 ohms). This means a sudden and important fault has occurred on the line. Such a variation may be associated with the fall or entanglement of a person or animal on the fence line. Thanks to its micro-controller, your Ultra Low Impedance energiser will only send six standard pulses (5 Joules maximum). If the fault is still identified, an alarm bell will sound for 10mn or until the disappearance of the fault if this occurs in less than 10mn, and one pulse in three will be sent. One pulse in three gives a maximum level of security. At the end of 10mn, the device will resume its normal cycle and may correct the faults if necessary by sending more energy, level by level as described above.

This energiser complies perfectly with the safety curve set out by Amendment A12 of the regulation concerning the quantities of energy sent along the line as a function of the state of the line. As required by A12, the measurement and punishment occur immediately in the same 10 ms maximum pulse, ensuring maximum safety for any person or animal coming into contact with the line.

Nevertheless, we require you to place a warning sign every 10 metres along any public footpath or highway.

■ Additional installation for ultra-powerful devices

Your energiser UBI is an ultra-powerful device. It can only send its full power if you have an impeccable installation. The energiser is capable of containing animals in the worst conditions with abundant vegetation, but on the sole condition that it is given the means to do so. This is why it is of the utmost importance to drive in at least 5 one metre earth stakes (ref. 07 000 332) in a damp place (below a drainpipe) at one metre intervals with an ordinary 6mm² section copper wire. The ground is the most important part not to be neglected since it returns the electricity to the device. Poor soil conditions will block all or part of the energy the energiser intends to send. It is important to use special high voltage cable to guide the energy of the Ultra Low Impedance device towards the electric fence, especially if crossing a wall. Standard cable is made for a few hundred volts and is not suitable for high voltages.

As regards conductor wires, the only wires that work with this type of device are those made of galvanised steel with a very low ohmic resistance, i.e. they offer the least resistance to the passage of electricity. These are electricity carrying wires : (CAG, single strand, aluminium wire, steel wire, smooth equine cable,

etc...). It is extremely important to favour this type of wire for carrying energy. Then to divide an enclosure into separate parcels of land, split a field in two, etc... you can use any type of wire, even electro-plastic wire that can easily be found on the market. On the other hand, you need to know that if vegetation grows close to these widely marketed wires, that are much less suited to carrying large amounts of electricity, the Ultra Low Impedance energiser will not be able to send the required quantity of energy to that spot. However, often vegetation is not an issue with dividing the enclosure into strips and operation will be perfectly ensured in the event of this type of wire falling to the ground and considering lengths of a few hundred metres. To summarise, widely marketed wires must not be used in series or to power a whole enclosure. On the other hand, carrying wires can be used over several thousands of metres. In order to improve performance, it is advisable – where possible – to go on a tour around the land to be contained, returning to the point of departure. The purpose of this is to divide the distance by two with respect to the energiser by the simple fact of powering the same line from both the right and the left. Furthermore, it is recommended that all the conductors be connected together at the start of the line and also at the end of the line when there are several heights, this corresponds to increasing the section of the conductor and improving its conductivity for a maximum passage of electricity. One day when the wires are covered in vegetation your Ultra Low Impedance energiser will show off its power to the full extent!

Where you use insulating gate handles, it is important if the gate handle is located on the main carrying wires to make the passage from one side to the other using a THT special cable buried in a cable duct (*fig. 2*). This is a parallel assembly to the aerial wire. In this way, all the electricity will travel along this cable and continue to power the rest of the enclosure, even if you drop the gate handle on the ground during the time it takes to pass through. Another reason: this facilitates the passage of the current because the contact surface of the insulating handle on the conductor wire is so small that with a lot of energy a series of sparks is set off that could disturb radio waves, make a crackling noise and above all cause rust that would restrict the carrying of large amounts of energy over time.

BE CAREFUL WITH MEASUREMENTS !

When you want to measure a voltage sent by the Ultra Low Impedance energiser, you should know that the digital equipment available on the market does not work. The explanation : we have already seen that the pulse formed by your Ultra Low Impedance energiser consists of a minuscule measurement pulse and a punishment pulse that depends on the result of the measurement, this all happens in a relatively short space of time, so short that the animal only

feels one shock. Electronic devices with digital displays are very fast and consequently only take into account the first information they receive and then freeze. In short, they display the measured voltage value and not the punishment value so that you have the impression that the Ultra Low Impedance energiser only gives out a few hundred volts. However, you soon realise the measurement is false when you see the sparks, their length and the noise in relation to the value displayed. The same is true of joulemeters that do not take the punishment curve into account, freezing at the first piece of information needed by the Ultra Low Impedance energiser in order to calculate the line impedance.

To carry out a true measurement, you should use the C15000 with indicator lights. In fact, the lamps will light up according to the maximum inclusive voltage on the line, not over one part of the curve only but over the two curves. The punishment curve will be taken fully into consideration visually when the measurement is made.

Further information

This Ultra Low Impedance energiser needs no maintenance. In the event of the malfunctioning of certain components, an internal system controlled by the microcontroller (a sort of tiny computer) enables it to continue working in minimum mode (5 Joules), level 1. It will not increase the level. In the case of a bug in the internal computer program, the computing device consisting of the measurement circuit and the microcontroller will restart automatically (“guard dog” system). This prevents a definitive bug in the event of significant interference owing to a storm and its electromagnetism. This device, although fitted with EMC compliant anti-interference systems, can if the connections between the fence wires are badly made and cause sparks, disturb radio transmissions. It is your responsibility to construct installations that are “electrically correct” with good insulators and good connections. Do not hesitate to use the technology at your disposal such as « quicklocks », etc...

Owing to its “automatic restart” mode, your Ultra Low Impedance energiser should not suffer from bugs. However, if it does get a bug, disconnect it and then re-connect and it will start to work again

In the event of a serious fault, the words “FAILURE RETURN SAV” will be displayed on the main screen. Return the device to your retailer. **DO NOT OPEN THE ULTRA LOW IMPEDANCE ENERGISER THIS WILL INVALIDATE THE WARRANTY.**

Repairs can only be carried out at the factory where the energiser was manufactured given the equipment necessary for calibrating the computer in the event of certain parts being replaced, diagnostic tests, entering fault mode to determine the cause of the problem, etc...

• RESPONSIBILITY

Our company declines all responsibility in the event of an accident following a change of state, of parts, of settings or of anything else inside the Ultra Low Impedance energiser. **ANY INTERVENTION BY PERSONS WHO ARE NOT PART OF THE CHAPRON COMPANY IS PROHIBITED.**

► Installing the solar panels

Tous nos appareils de clôture fonctionnant en 12 Volts All our 12 Volt fencing equipment can be solar operated.

You need to take advantage of this free energy that can prolong the usage time of your battery without having to recharge it. There will be a type of solar panel for each energiser according to its consumption. This does not mean that you will never have to recharge your battery again! Solar energy depends on the region, sunshine, temperatures, etc... and that varies from one year to the next. But it will give you a bit of a boost when you need it most over the period from April to October. In excellent conditions, there will be no need to recharge during this period.

It is possible to have a system that only uses solar energy 24h/24h, 365 days per year. A specific calculation must be made according to your region and the obligatory use of a battery charge regulator to prevent your battery from being overcharged owing to an oversized solar panel. Ask your retailer for this calculation, he will be able to access our technical service.

WARNING !

Important safety instructions !

- Never connect the output wires from the module if they risk coming into contact with each other. (The module supplies energy as soon as there is daylight).
- Do not operate the panel near flammable gas, (charged batteries), solvents, vapours, etc...
- Dangerous explosive gases may form in the proximity of the battery if this is overcharged. The battery must therefore be installed in an aerated location.
- Pay attention to the polarity of the module, any inversion of polarity can seriously damage the solar module, the associated electronics and the battery, or cause short circuits. There may be a risk of burns caused by a short-circuit if polarity is not respected.
- Never make a short-circuit with the output wires from the solar module.
- Installing the solar module on your energiser will

make the device more autonomous, but you must regularly check that the assembly is working correctly in order to ensure surveillance.

- In the event of a period of non-utilisation, disconnect the solar panel from the accumulator. Make sure you store an accumulator that will not be used for a while fully recharged (top up with a charger, if necessary). An accumulator that is stored almost empty for an excessive period of a few months will not recharge. Its warranty will be invalidated.
- Never use or operate your energiser with just the solar panel without connecting the battery, this risks seriously damaging your device.

► Operating description

Your module can be used without a charge limiting device or regulator since it is in the unique condition of being perfectly calibrated in relation to the energiser to which it is to be connected. Your energiser should also not be stopped for more than one day if it is in full sun without taking the precaution of disconnecting the two wires of the solar panel. This precaution will prevent the battery from being overcharged with the risk of considerably reducing battery life and its warranty.

All our modules are adapted to specific types of energiser according to their power. If you use a module with a lower power than that recommended, you will only obtain very mediocre results from your installation.

We recommend "module/energiser" self-compensation, i.e. a specific panel power for a specific energiser model, that will allow recharging and battery maintenance to be more spaced out. The installation will be relatively autonomous during periods of good weather, but it will still be necessary to recharge the battery when there is reduced sunshine and with negative temperatures. Let us remind you that a discharged lead acid battery can freeze and explode in negative temperatures.

If you want to make your installation more autonomous, this can be done by increasing the power of the solar module – either by connecting a solar panel that is more powerful in Watts, or by adding another module. In this latter case, it is obligatory to fit a charge limiting or the regulator device.

The charge limiting or the regulator device prevents the battery from overcharging when there is strong sunshine. It manages the battery voltage.

Do not hesitate to ask for advice from your retailer.

The standard kit supplied with your panel includes a red wire and a blue wire. On the red wire there is a terminal for receiving a "diode module", consisting of a small black cylinder with a coloured ring sandwiched between two terminals. This part is the anti-return diode and must not on any account be removed. This diode prevents the battery from dischar-

ging in the solar module when the latter does not receive sufficient light. Removing this diode would cause the complete malfunctioning of the assembly. Only connect this diode last, after carrying out the implementation procedure described below.

■ Implementation

• With a standard lead battery, round terminals :

To ensure the best performance of your module, attach the panel to the specific support recommended by us if you have chosen this option. Four attachment screws are contained in the sachet on the back of the panel for this purpose.

Then insert the support base into the back of the galvanised body in the cut-outs provided. No screwing or drilling is required. Pass the red and blue wires through the cut-out located on the back of the galvanised body at the top. (See Fig. 10)

For the ABS (plastic) battery body, remove the 5 cm by 5 cm square black plug situated over the device cover. Insert the panel support in the grooving. No screwing or drilling is required.

Pass the two solar panel wires through the V-shaped slot in the battery body. (See Fig. 20))

Your panel must be fixed at 45° from the sun and face due South. In this direction it will capture the most sun and therefore the maximum energy. Then connect the red wire (positive pole) to the anti-return diode, that has been disconnected from the solar panel module wire at the "+" terminal of the battery, having taken care to remove the screw on the spiral terminal in order to re-assemble on this same screw:

- the energiser "+" wire terminal with a round lug;
- the solar panel terminal with a round lug (terminal used for the anti-return diode).

Follow the same procedure with the blue "-" wire of the energiser. In this way, all the positive poles will be connected together and all the negative poles will be connected together.

A positive pole must not at any time be connected to a negative pole! Be particularly careful when connecting to the battery.

As with a vehicle, any inversion will cause a short-circuit with the risk of irrevocably damaging certain components such as diodes etc...

Now connect the larger spiral terminal of the red wire to the positive battery terminal. Then connect the smaller spiral terminal of the blue or black wire to the negative battery terminal.

Lastly, connect the red wire of the solar module to the diode that you have previously connected to the rest of the system. (fig. 30)

If you have scrupulously followed the above instructions, your energiser will now be ready for operation.

• With a lead gel battery (device safe plastic) with faston or screw terminals :

Pass the red and blue wires through the V-shaped slot in the ABS body for the gel battery.

Your panel must be fixed at 45° from the sun and face due South. In this direction it will capture the most sun and therefore the maximum energy.

You must obtain a kit termed "OCEAN/SILVER solar adapter" in order to make all the connections .

Once you have this kit, remove the original anti-return diode from the red solar panel wire and connect the red cord from the kit fitted with a new anti-return diode in the place of the original diode. (fig. 50)

Remove the black cord fitted with a terminal with a round lug from the end of the solar panel wire and replace it with the black cord from the kit.

Take care to respect the polarities before proceeding to make the following connections. Any inversion of polarity is harmful to the battery, the solar panel and the wiring system (diodes etc...).

Then connect the red wire (positive pole) of your new assembly to the "+" battery terminal.

Connect the blue or black wire (negative pole) of your new assembly to the "-" battery wire.

You can now connect the unused red wire to the "+" male connector of the energiser, as well as the black wire remaining on the "-" connector of the energiser. (fig. 6)

The assembly is now ready for operation.

■ Using a charge regulator

If you use a solar panel that is higher than 20W or if your panel is likely to remain in full sun while your energiser is in "stop" mode for long periods, it is necessary to use a charge regulator.

In this case, the solar panel is no longer directly connected to your energiser battery (+) wires together and (-) wires together), but is connected to the charge regulator. (See the instructions for fitting the charge regulator).

■ Solar panel trouble-shooting guide

• I often recharge my battery, about every 3 weeks :

It is very likely that your solar panel is no longer charging. You need to check it : leave your panel exposed in full sun disconnected from the battery and with no wire touching it. When empty, using a voltmeter in the position "continuous or DC voltage" you must obtain 20 Volts minimum. If you do, the problem is caused by your battery that no longer holds the charge. If you cannot obtain 20 Vdc, disconnect the anti-return diode and take the measurement again. If you obtain 20 Volts or more, your diode needs to be replaced. If you still cannot obtain anything, your solar module is faulty.

- **My battery is flat, it does not recharge :**

Your battery is at the end of its life. It has either been charged/discharged a significant number of times, is several years old or has undergone a deep discharge (it has been flat a long time). It will be impossible to make it work again, replace the battery.

- **AS A GENERAL RULE**

In all cases, check the condition of the spiral terminals connected to the battery. They must not be oxidised, if they are oxidised they must be changed. This is because the contact between the battery terminal and the spiral is very important, otherwise your panel will be operating empty and the battery will never be charged by the panel. ALWAYS orient your panel towards the sun at an angle of between 30 and 45°, due SOUTH.

Chapron-Lemenager

ZA du Calvaire
14230 ISIGNY-SUR-MER - France

Tél. : 33(0) 2 31 22 02 55

Fax : 33(0) 2 31 22 68 18

contact@chapron-lemenager.com

www.chapron-lemenager.com

© Tous droits réservés.

